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## RAINFALL MAPS OF CUBA

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[State Teachers College, Johnson City, Tenn., May 1939]

A set of monthly rainfall maps<sup>1</sup> of the island of Cuba, based on the records<sup>2</sup> of 19 stations, was published in May 1928. Since that time additional data<sup>3</sup> have been recorded warranting a new set of maps, which, although similar in the major trends of the isohyets, show more local detail than has been possible previously. Of the 171 stations used in this study, 47 had from 4- to 6-year records, 79 from 7- to 11-year records, 27 from 12- to 20-year records, and 18 had from 21- to 67-year records. These included two stations on the Isle of Pines. The unreliability of short-term rainfall records is fully realized, but in all cases the longest record has been used in determining the final placement of the isohyets.

Cuba, about the size of Pennsylvania, has an area of 44,000 square miles. It is two and one half time as long as Pennsylvania and attains its maximum width of slightly over 80 miles in central Oriente Province. In contrast to most other islands of the West Indies, Cuba is essentially lowland, being distinctly mountainous or hilly in less than one-fourth its area. The construction of isohyets in these small, but relatively remote, areas must of necessity be theoretical, due to the paucity of stations in the sparsely inhabited uplands.

Cuba is under the influence of the trade winds throughout the year. In general, the wind prevails from the northeast from October to April and from the south and southeast during the summer months. The shift to the southeast in April is due to the general continental heating and lowering of pressure to the west and northwest of Cuba causing the trades to be drawn toward the North American continent in summer.

Pena Blanca, number 3 on the key map of Cuba, in Pinar del Rio Province, with a 5-year record, has the island's maximum annual rainfall of 79 inches. Union de

Reyes, number 4 in Matanzas Province, with a 21-year record, ranks second with a 70-inch average.

The United States Naval Station at Guantanamo Bay, number 36 in Oriente Province, with a 10-year record, has the island's minimum annual average, slightly over 28 inches. The plains of the Guantanamo Bay area and the coast east of them are described by Bennett<sup>4</sup> and Leon<sup>5</sup> as the driest parts of the island.

The rainfall regime over most of Cuba has May-June and September-October double summer maxima. The only exception to this is the northeastern part of the island which experiences May-June and November maxima. Unlike the other portions of Cuba, this section receives its greatest rainfall in the months from October through February. The average annual rainfall of all stations on the island is 52.5 inches. In general the interior of the island receives more rainfall than the coastal areas.

From 50 to 75 percent of the area of Cuba receives less than 1 inch of rainfall in December and February; sections receiving more rain during these months are the mountains and north coast, since the trades are from the northeast at this time. In January there is a slight increase throughout the island. As the trades shift to the east and southeast in May, the south coast receives more rain. Thundershowers are most prevalent over the island from May to November, especially in the interior; during these months, the northeast coast receives less than the rest of the island.

The secondary rainfall minimum in July and August is associated with higher barometric pressure. In September and October the maximum is brought about by lower pressure, by occasional hurricanes, and, according to the late Dr. O. L. Fassig, by temporary "rapid increases in the depth of the trade winds which bring about a conflict with the so-called antitrades."<sup>6</sup> The increased rainfall due to orographic precipitation in the mountains and major hill areas shows up on most of the monthly maps.

<sup>4</sup> Bennett, Hugh H. and Robert V. Allison, *The Soils of Cuba*, Washington, D. C.: Tropical Plant Research Foundation, 1928.

<sup>5</sup> Shreve, Forest, editor, *Naturalists Guide to the Americas*. Section on Cuba by Brother Leon. Baltimore: Williams and Wilkins Co., 1926.

<sup>6</sup> Fassig, O. L., "The Trade Winds of the Eastern Caribbean" Transactions of the American Geophysical Union, Fourteenth Annual Meeting, 1933.

<sup>1</sup> Focoue, Edwin J. "Rainfall Maps of Cuba," Mo. WEA. REV., 56:170-173, May 1928.

<sup>2</sup> Fassig, Oliver L., *Rainfall and Temperature of Cuba*, Washington D. C.: Tropical Plant Research Foundation, Bulletin No. 1, 1925.

<sup>3</sup> From 1927-33 the Cuba Sugar Club kept records of more than 1,000 rain gages scattered over the sugar-producing lands of Cuba. Mr. Charles Thrall, formerly a director of the now disbanded Sugar Club furnished the author with data published by the club during that period. These statistics, together with those published by W. W. Reed, Dr. O. L. Fassig, the United States Weather Bureau in its *Climatological Data, West Indies and Caribbean Service*, and data furnished by the United States Guantanamo Naval Station, form the bases for the construction of the maps accompanying this study.











